Effects of Timber Harvest on Red-Shouldered Hawks in the Menominee Indian Reservation

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The Red-shouldered Hawk (*Buteo lineatus*) was listed as a threatened Species in Wisconsin in 1979. Population trends from the North American Breeding Bird Survey show that Red-shouldered Hawk (RSHA) abundance (from 1966-2000) in Wisconsin had the greatest negative trend of any state in North America. Local research efforts have focused on long-term monitoring of productivity, nest-site fidelity, and mark recapture. However, very limited data exists on statewide abundance, population status, or the influence of timber management practices on Red-shouldered Hawks.

We are utilizing a demographic approach to assess the effects of timber harvest on RSHAs. We intend to measure RSHA reproductive success, breeding density, nest and territory fidelity, and habitat changes within the Menominee Indian Reservation. Our objective is to compare these variables within actively harvested compartments with those nesting in unharvested compartments. Because human-caused disturbances can alter adult behavior and ultimately result in nest failure, Menominee Tribal Enterprises has agreed to implement two seasonal guidelines within the study area that are essential to the study's success. The guidelines require no timber harvesting or interior forest trail building from March 1 to September 1, and no timber

marking activities from March 1 to June1 in the study area.

Objectives:
1. Measure RSHA abundance, habitat use, and reproductive success in a mature, contiguous forest.
2. Compare RSHA habitat use, productivity, and prey utilization between harvested and unharvested forest stands.
3. Determine the presence of and risks associated with West Nile Virus in RSHAs.

Methods: We use broadcast surveys of conspecific calls along the forest road network and interior compartments to help locate active territories. Survey stations are placed ½ mile apart along all driveable roads within the study area. Interior areas > ½ mile from a road are surveyed along forest trails on foot.

The nest tree habitat is defined as a 400m^2 (0.10 ac) circle centered on each active nest tree. In addition to nest plots, we are collecting habitat data from random plots located throughout the study area. Random plots were created using a random point generator script written for the Geographical Information System (GIS) software ArcView® (ESRI, Redlands, CA). Only random plots located within Northern Hardwood and Hemlock-Hardwood forest types are sampled. We are measuring 15 different habitat variables within each plot. Comparison of random and nest plot data will

identify the habitat characteristics RSHAs are selecting for or against within the study area.

Prey utilization will be determined using small security video cameras mounted above the nests and time-lapse video cassette recorders placed near the nest tree.

Preliminary Results: We found and monitored 15 occupied RSHA nests in 2002. Of this total, 13 nests were active, six were successful, and 10 young were raised to fledging age. Final productivity measures were 0.77 young/active nest, 1.67 young/successful nest, and a 46% nest success rate.

Nest plots were significantly closer to trails and open wetlands than random plots. Densities of short and tall stems were statistically greater at nest plots, but no significant difference was found for the timber size classes. There was a statistically significant increase in species diversity of short stems at the nest plots, but not for tall stems and timber. RSHA also selected for greater canopy coverage at their nest sites. Although the number of very large saw timber (dbh $>$55cm) and total basal area were greater at the nest plots than at the random plots, these differences were not statistically significant.

Management Applications:

1. Results from this study will provide baseline data on Red-shouldered Hawk breeding densities and ecology within a large unfragmented, mature forest. This information will aid DNR in determining current population numbers and in developing statewide population goals for RSHA recovery and future de-listing.

2. This work will provide timber harvest management guidelines for RSHA that include minimum nest habitat structure and composition parameters. These results will provide valuable information for managing forests on both public and private lands throughout Wisconsin.

3. Tissue sampling and analysis will help determine susceptibility and risk of West Nile Virus to RSHAs. In addition, this work will assist in assay development and blood serum neutralization validation efforts.

Timeline:

2003 - Completion of pre-treatment data collection.

2004 - Timber harvest within Study Area begins. Continue monitoring return rates, territorial activity, reproduction, and begin post-treatment habitat evaluations.

2005 - Timber harvest within Study Area continues. Continue monitoring return rates, territorial activity, reproduction, and begin post-treatment habitat evaluations.

2006 to 2007 - Timber harvest within Study Area is completed. Continue monitoring return rates, territorial activity, reproduction, and complete post-treatment habitat evaluations. Complete field activities, prepare final report and manuscripts.